- Proceeding: IN THE MATTER OF DEPLOYMENT OF WIRELINE SERVICES OFFERING A Record 1 of 1

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DOCKET FILE COPY ORIGINAL

Zip Code: 94303 Postal Code:

Submission Type: CO Submission Status: ACCEPTED Viewing Status: UNRESTRICTED

Subject:

DA Number: Exparte Late Filed: File Number:

Calendar Date Filed: 09/25/1998 6:29:09 PM Date Disseminated: Filed From: INTERNET

Official Date Filed: 09/25/1998 Date Released/Denied: Initials:

Confirmation # 1998925203774 Date Filed:

INTERNET FILING

98-147

9/25/98

RECEIVED

SEP 25 1998

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OFFICE OF THE SECRETARY

No. of Copies rec'd 1

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As a leading vendor of DSL telecommunications networking equipment, Copper Mountain endorses the effort to spur deployment of advanced wireline services to all market sectors and submits the following comments.

Comments on Paragraph 162: Multiple service providers on the same loop.

1. The residential market for data services and Internet access is very price elastic. Today, some consumers are willing to pay for a second line (approximately $20) plus the cost of Internet access (also about $20) for a total of $40 per month. Many consumers just use their primary voice line for Internet access. These consumers are only allocating $20 of their household budget to data services. While DSL provides much more bandwidth than POTS-based dial-up services, it is not clear that households are willing or able to allocate more of their disposable income to data services. The logical conclusion is that DSL will not significantly penetrate the residential consumer market unless it is priced attractively.
2. An intuitive comparison of the economics of DSL deployment for CLECs and ILECs reveals some fundamental requirements for the competitive marketplace essential to rapid deployment. For a CLEC, the cost of the unbundled loop is a recurring, monthly, cash expense. While pricing varies widely throughout the United States, $20 per month is an acceptable median for the purposes of this example. For the ILEC's DSL service, the cost of the outside plant is predominantly sunk, and these costs are incorporated into the ILEC's tariff for voice service. With average usage of the ILEC voice service, the voice revenues pay for the local loop. The ILEC, therefore, does not need to cover this cost with DSL revenue.
3. Unless the CLEC provides a similar residential voice service, the CLEC must use revenue from its DSL data service to pay for the loop. If a CLEC needed a gross margin of 50% to have a viable business, the extra $20 of monthly cash cost results in a $40 per month higher price that the CLEC needs to charge. The CLEC cannot meet a price point that is attractive to consumers, and in addition, the CLEC cannot provide a service that is competitively priced relative to incumbents.
4. It is clear that, for the residential market, the CLEC must provide a voice and data service on the same pair such that the CLEC can similarly pay for the loop with voice service revenues. There are several ways that the CLEC can provide residential voice service. The CLEC can locate a switch remote terminal in the colo cage, the CLEC can provide a packet-based voice service, or the CLEC could purchase unbundled switching elements from the ILEC.
5. Remote terminals are being deployed by some CLECs for providing business voice services, since business customers often have high usage and many features. The revenues associated with these minutes and these features can justify the expense of a remote terminal. However, the remote terminal approach is an expensive one for residential customers. Because of the cost, only the wirecenters with high concentrations of potential customers may qualify. This may leave more sparsely populated or lower income areas out.
6. A packet-based voice service is not lifeline POTS—service would typically be lost during a power outage. In addition, packet voice equipment vendors are still struggling to achieve the 'toll quality' voice that residential customers have come to expect. There are additional complexities associated with supporting E911 service.
7. Unbundled switch elements can provide the lifeline POTS that the CLECs need. There are, however, a number of unknowns associated with unbundled switching.
    - OSS support is especially complex—will the CLECs be able to get access to the RCMA functions necessary to provision customers and change service features?
    - In many states, there is a per-minute charge associated with unbundled local switching. Since the residential market is predominantly flat-rated, it may be difficult to create a viable competitive service when cash costs are variable.

8. Copper Mountain believes it is imperative that CLECs be able to resell the voice service of the ILEC on an unbundled loop. This creates a viable DSL service for the CLEC and it levels the playing field between the CLEC and the ILEC.

9. It is noted that the price for resale service is retail price net of avoided cost. While the avoided cost has been primarily associated with selling and admin costs, it is obvious that, in this approach, the ILEC is also avoiding the cost of the outside plant, since the unbundled loop is being sold to the CLEC.

10. It would also be unfair to the incumbent LECs if they were shut out of the voice business by the CLECs. If CLECs end up pursuing alternative means of providing voice service, the ILECs will lose traffic and customers off of their largely fixed cost, circuit-switched, voice network. It is unfair not to give the ILECs the opportunity to compete to provide voice service to the CLECs.

11. There are several practical considerations associated with placing resale voice service on the DSL loop. To facilitate troubleshooting the resale voice service, the ILEC should have access to the Central Office POTS splitter (the high pass/low pass filter). This way, the ILEC has access to the end-to-end voice service. Copper Mountain notes that a POTS splitter is a low-cost, high-reliability, passive piece of equipment.

12. Since the ILEC controls the central office POTS splitter, interference into the voice band associated with the DSL signal emitted from the central office is eliminated. However, faulty or non-standard premise equipment could cause interference between the voice signal and the DSL signal emitted from the premise. This is analogous to the situation today when there is a bad or faulty telephone set at the customer premise. If a field technician is dispatched and problem is in the premise equipment, the customer is charged for the visit. In the competitive environment, the ILEC would charge the CLEC and the CLEC would either charge their customer or cover the cost themselves. The economics of this approach would quickly eliminate non-standard CPE from any LEC's network.

13. Copper Mountain concurs with the Commission's tentative conclusions that "...any voice product that the incumbent LEC provides to its advanced services affiliate would have to be made available to competitive LECs on the same terms and conditions."

Comments on Paragraphs 159 – 161: Loop Spectrum Management

14. Copper Mountain believes that the Commission should adopt national regulations and/or standards on spectrum management. Copper Mountain agrees with the Commission's proposal to apply rules to both ILECs and CLECs.

15. The nature of crosstalk and spectral interference is fairly complex. It is a function of power, frequency, bits per symbol, and even the principles used to rate-adapt. Some simple observations can be made which will help guide policy making.

16. Some technologies, like DMT, encode many bits per symbol. These technologies tend to be more 'fragile', more susceptible to interference. Conversely, AMI T1 encodes fewer bits per symbol. This tends to make it less susceptible to outside interference.

17. Some technologies (DMT and CAP) include rate adaptive features. These features enable the line to dynamically adjust to noise conditions from disturbers. Thus, as noise increases, data doesn't necessarily stop flowing; it 'detours' around the noise at a reduced line rate.

18. The combination of the high bit encoding rate and the rate-adaptive feature is the best of both worlds: high bit rate on cleaner loops and the ability to provide *some* service even in noisy conditions. However, service providers that choose rate adaptive technologies must live with the fact that the highest line rate may not always be available, depending on the noise characteristics of the loop.

19. Interference is a function of the number of disturbers in the binder as well as the distance that the disturbers travel together. With more interferers, the distance at which a line rate can be achieved is reduced. Some interference is so egregious that no traffic will flow.

20. Almost all predictions of interference are based on theoretical models. If no traffic is flowing at the time or if the line is powered down, the actual noise generated by the disturber may be mitigated or eliminated.

21. In some cases, there are transmission technologies (such as ISDN and HDSL) that the ILECs have been deploying profitably for several years. The ILECs have not employed cumbersome spectrum management plans. With the advent of competition, it is strange that the ILECs suddenly find the need to manage the CLECs' deployment of these same technologies into the networks.

22. Some ILECs have defined an arbitrary quality threshold (in speed and distance) for their own service and are planning on reserving 'clean' binders for their chosen technology (and other technologies that exactly match the spectral characteristics of their technology). While this approach may seem innocuous, it can easily be used to restrict competition:
    - The ILEC could reserve many binders in areas where CLECs are targeting customers
    - If the ILEC has not deployed much DSL service, and the CLEC is rapidly deploying, the CLEC could be told that there are no more pairs available. In fact, there may be pairs available that the CLEC could use <u>without</u> interfering with existing ILEC service, but these pairs are reserved against the *possibility* of future ILEC deployment. Clearly, this unnecessarily restricts competition.

23. It is ironic that many of these ILECs have chosen to deploy a rate adaptive technology whose very purpose is to adapt to noise conditions.

24. A useful analogy to the rate adaptive technologies is a user on a 10Mbps shared Ethernet LAN. When that is the only user on the Ethernet segment, the user can approach the 10Mbps limit. As more users are added, the amount of bandwidth available to that user drops.
    - From a service perspective, this analogy raises questions about how a service should be structured in the marketplace. The Ethernet user is not told that 10Mbps will *always* be available.
    - Interestingly, shared Ethernet is how many cable modems work. The cable companies have managed to make an effective service offering in spite of the adaptive or changing nature of the available bandwidth.
    - The LECs are marketing the <u>rate-adaptive</u> technology as a <u>fixed rate</u>, for example, 1.5Mbps x 384kbps. These fixed line rates give rise to the arbitrary thresholds discussed in #22, above. There is no reason why the service could not be marketed as a best-effort service (that *is* what rate adaptive means). The average line rate could be measured through the month and the end-user could be billed based on this line rate.
    - The rate adaptive nature of the technology should be marketed as a differentiating feature, **as opposed to being sold as a fixed rate and then used to erect barriers to competition.**
    - In the shared Ethernet example, remedies are taken *<u>after</u>* service degradation is actually observed. The cable companies have astutely recognized that they will encounter problems only if their service is very successful. They would be glad to have this problem and will develop a solution at that time.

25. Copper Mountain requests that any analysis that the ILECs use to restrict deployment of technologies into the outside plant be made available for review, for the following reasons
    - There may be equipment adjustments that resolve the alleged problem
    - There could be less onerous restrictions available than total exclusion. For example, a line coding could be restricted by distance (loop length) or by number of pairs in a binder.

Comments on Paragraph 169-175: Sub-Loop Unbundling

26. Copper Mountain agrees with the Commission that sub-loop unbundling should be required where technically feasible. In particular, the CLEC should be able to gain access where the RT is located in a building equipment room. This is the case in many office parks. In addition, the inside wiring of some multi-tenant buildings was sold back to the ILECs. CLECs should be able to get access to these copper pairs.

27. Copper Mountain agrees with the Commission that provisioning around a DLC using copper should be done where feasible.

28. CLEC's should be able to colocate at an RT on a first-come, first-serve basis. Additional space could be made available at many RT sites using new construction.

29. Network management issues are difficult to overcome where the ILEC is providing xDSL ports in the DLC. The CLEC would need to get management access to the DLC to isolate trouble and to provision customers.